Space Weather Forecast

Issued on Thursday, 29 February 2024 at 00:34 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Ongoing risk of Moderate or Strong flares from the large sunspot in the northwest.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate during the last 24 hours with a long period Moderate-class flare, peaking at 28/1854 UTC from the large region in the northwest. This remains the largest and most significant potential flare source. The magnetic structure of the group shows some magnetic complexity. This spot also has a large amount of magnetic flux, increasing the potential for larger flares, should any occur. The other regions are smaller, however a region near north centre disc has seen ongoing growth with latitudinal spread, becoming a more mature spot. Two further regions in the northeast are both much smaller, but have a N-S aligned magnetic structure which could increase instability.

Three Coronal Mass Ejections (CMEs) of note were observed in the last 24 hours. One from an eruption from the southeast of the disk around 28/0909 UTC and the other towards the northeast, although with an uncertain source. Both have been analysed as largely missing Earth, although some glancing influence cannot be completely ruled out. A further CME from the large region in the northwest associated with the long period M-flare is yet to be analysed, awaiting imagery. A further CME from the large region associated with the long period Moderate flare is yet to be analysed, awaiting imagery.

Solar Wind / Geomagnetic Activity: Solar winds showed a minor enhancement - perhaps some limited coronal hole fast wind influence. Wind speeds were mostly slightly elevated, varying between 380-460 km/s. Interplanetary magnetic field was weak throughout, with the north-south component varying weakly and mainly southward directed. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels with no radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with isolated Moderate-class flares. There remains a slight chance of Strong flares from the large sunspot in the northwest.

Solar Wind / Geomagnetic Activity: There are three recent CMEs which are all most likely to miss Earth, but with a risk of some glancing influence, most likely on Day 3 (02 Mar), perhaps extending into Day 4 (03 Mar). Solar winds have become slightly elevated once again, likely due to some weak interaction with a coronal hole fast wind. No further notable enhancements are expected with any other coronal holes on the disc too far south to influence Earth. Geomagnetic activity is forecast to be mostly Quiet, but perhaps increasing to Unsettled to Active with any CME influence on Days 3 and 4.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels, but with a slight chance of rising above the S1/Minor Radiation Storm threshold in response to any notable flares from the large sunspot in the northwest of the disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	50
Very Active	R3 to R5 X	No	20	20	20	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	5	5	5	5
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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